ORIGINAL

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington DC 20554

In the Matter of:	)	
	)	RM-_____
Petition for Rulemaking To Allocate	)	
the 5.1 - 5.35 GHz Band and Adopt	)	
Service Rules for a Shared Unlicensed	)	
Personal Radio Network	)	

WIRELESS INFORMATION NETWORKS FORUM
PETITION FOR RULEMAKING

WIRELESS INFORMATION NETWORKS FORUM

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SUMMARY

Today's emerging multimedia computer applications use audio, data, graphics, and video interchangeably to create powerful automated tools for education, business, industrial, and medical applications. Even with data compression, the extreme demands placed on transmission infrastructures by these multimedia systems will preclude the use of advanced computing in mobile applications unless the wireless network is allowed to evolve. The high speed Shared Unlicensed PErsonal Radio Network ("SUPERNet") is the next generation of wireless information transmission systems. SUPERNet is a radical re-thinking of wireless computer communications designed to incorporate the latest advances in the wired network, such as Asynchronous Transfer Mode and Broadband Integrated Services Digital Network capabilities, into a wireless architecture. SUPERNet will provide a wireless interface for multimedia resources that fully realizes the benefits of mobile computing for the American public.

SUPERNet is designed explicitly to meet the high-speed, high-bandwidth needs of emerging multimedia computer applications. SUPERNet is intended to operate on an unlicensed basis, allowing short-to-medium range transmission of digital information at rates of approximately 20 *million* bits per second ("Mbit/s"). This high bandwidth will allow SUPERNet to support the intense demands of multimedia technologies under a range of deployment options, including:

- High speed networking among computers with fixed access points (wireless LANs);

- Wireless network access to the full range of resources available through the broadband network transmission infrastructure (wireless access); and,

- End-user to end-user networking on an ad hoc basis without fixed infrastructure (ad hoc networking).

To realize the promise of SUPERNet, WINForum is seeking allocation of the 5.1-5.35 GHz band for SUPERNet. WINForum has calculated that 250 MHz of spectrum will be needed in the near term, and 350 MHz of spectrum will ultimately be required, to accommodate the 20 Mbit/s data rates and 200 Mbit/s/hectare requirements for deployment of SUPERNet in high density areas. Unfortunately, the spectrum below 3.0 GHz is too congested for a new allocation of this magnitude and use of spectrum above 10.0 GHz would be cost-prohibitive. After considering deployment options for SUPERNet in the 3.0-10.0 GHz band, WINForum identified an unparalleled opportunity for SUPERNet in the 5.1-5.35 GHz band. Specifically, the 5.1-5.25 GHz part of this band is currently being phased out by the U.S. for Microwave Landing Systems in favor of differential GPS, which will release 150 MHz of spectrum. While the 5.1-5.25 GHz band is a candidate for MSS feeder uplinks in upcoming WRC discussions, WINForum believes that SUPERNet could share spectrum with MSS feeder uplinks. Furthermore, the 5.25-5.35 GHz part of the band is currently being used for government radiolocation systems and WINForum believes that SUPERNet could also share spectrum with such operations. The 5.1-5.35 GHz band is also desirable because it maintains compatibility with European HIPERLAN developments and offers the potential for further sharing in the 5.35-5.50 GHz band to meet future SUPERNet needs.

SUPERNet is expected to operate in a shared, unlicensed environment. To avoid interference between devices, WINForum proposes adopting an industry consensus spectrum

sharing protocol or etiquette. SUPERNet is envisioned as comparable to the European HIPERLAN technology that will provide additional capabilities for U.S. users and additional opportunities for U.S. manufacturers. Like HIPERLAN, SUPERNet will provide data rates in excess of 20 Mbit/s and operate in the lower 5 GHz band, but SUPERNet will utilize a greater number of channels evenly spaced throughout the 5.1-5.35 GHz band and the sharing protocol is envisioned to be an improvement over the HIPERLAN standards. Technical standards work has already started in an industry standards forum to develop fully a consensus etiquette designed to allow interoperation and ensure mutual non-interference for SUPERNet devices.

WINForum believes that full development of SUPERNet is a necessary measure to ensure that the National Information Infrastructure reaches its full potential. Because SUPERNet is designed to address the needs of emerging multimedia computer tools, SUPERNet will serve as the bridge allowing users to export exciting and efficiency-enhancing technologies and applications to the classrooms, boardrooms, health care facilities, and work floors where they are needed. By acting expeditiously to authorize SUPERNet in the 5.1-5.35 GHz band, the Commission will help fulfill the promise of the National Information Infrastructure.

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In the Matter of:	)	
	)	RM-_____
Petition for Rulemaking To Allocate	)	
the 5.1 - 5.35 GHz Band and Adopt	)	
Service Rules for a High Speed Wireless	)	
Digital Service	)	

WIRELESS INFORMATION NETWORKS FORUM
PETITION FOR RULEMAKING

Wireless Information Networks Forum ("WINForum"), by its attorneys, herewith submits its petition for rulemaking to allocate the 5.1-5.35 GHz band for a new high speed Shared Unlicensed PErsonal Radio Network ("SUPERNet"). SUPERNet is designed to allow wireless access to the full range of data communications capabilities now being deployed in landline networks to support multimedia and other resource-intensive applications. And, just as multimedia technology has revolutionized *what* users expect of their computers, SUPERNet will revolutionize users' expectations of *when, where, and how* they are able to apply advanced computing technology. As discussed below, SUPERNet is a quantum leap forward in the field of wireless data communications that will provide businesses, industries, and the public with a wide range of important new capabilities. WINForum therefore urges the Commission to act promptly to realize the benefits of SUPERNet for the American public.

I. A NEW WIRELESS PLATFORM IS NECESSARY TO SUPPORT EMERGING ADVANCED COMPUTING APPLICATIONS

The realities of multimedia and advanced computing technology are upon us. It is now evident that accessibility, connectivity, and data interchangability are critical to allow businesses to retain a competitive edge, to permit rural and urban students alike access to the resources that provide sound educational futures, to permit health care facilities to function optimally, and to let people everywhere enhance the quality of their leisure time. To realize fully these goals of the National Information Infrastructure, however, the Commission must pave the way for a wireless access service that is capable of meeting the demands of new technologies and applications.

As the National Information Infrastructure takes shape, two distinct trends are becoming increasingly evident. First, wireless access to digital networks is a powerful and needed tool for enhancing productivity and efficiency in all sectors of work and life. Second, as evidenced in the development of wired networks, multimedia and other resource-intensive applications require a flexible, economical, high bandwidth transmission medium for local, wide area, and long distance digital communication. SUPERNet represents the next generation of wireless data and multimedia services -- a service uniquely designed to bridge the existing gap between the wired and wireless worlds and offer high speed wireless access for advanced applications. SUPERNet will open the door to a wide range of creative new applications for the public by allowing a state-of-the-art wireless access to the full capabilities of the broadband wired network for data, voice, graphics, teleconferencing, videoconferencing, and multimedia products.

A. Wireless Access to Networks Is Necessary To Realize Fully the Goals of the National Information Infrastructure

Computing technologies have already provided substantial benefits for every American. Yet, even today's multimedia applications provide only a glimpse of the potential to be realized in the very near future. At first, computers provided raw processing power capable of automating repetitive tasks, but were restricted to a very select few. Very soon thereafter, computing software was created to assist in more complex endeavors and computers became more widespread. Today, computers are recognized as vital tools that not only automate tasks, but also provide access to huge databases and allow the broad interchange of information. Massive computing power has been harnessed in portable, easy to use machines and the structure of landline communications networks has evolved to bring a universe of information within the grasp of most Americans. Unfortunately, for the most part, access to the wealth of information and resources represented by the collective computing world is still restricted in one respect -- mobility.

In education, for example, computers -- and networks in particular -- are being used increasingly in schools, in colleges and in the workplace. Computers, among other things, permit the simple distribution of teaching material, provide access to vast libraries of information, enhance interaction with teachers and among groups of students, and allow the sharing of assignments and research results. Yet, wired solutions can never provide the flexibility needed in educational institutions. The reality of current educational institutions, which is unlikely to change, is that students are highly mobile. High speed wireless

networks are the only systems that offer the mobility, flexibility, increased data rates, and enhanced network facilities needed to advance education and business.

The utility of computing power in medical applications is also constrained by a wholly wired network. In all developed countries medical care and hospitalization are becoming exceedingly expensive. These costs are caused in part by the complexity of medical systems, patient care and medication. The efficiency of medical staff can be improved by giving them on the spot, real time access to patient data, including x-ray and MRI images, video recordings, medical charts, and other records. Group diagnosis is made possible resulting in better and more efficient diagnosis of complex cases without the need for the relevant experts to physically get together. A high speed wireless system is the only cost-effective solution that can provide the flexibility and the span of performance needed.

Wireless access to the National Information Infrastructure will also enhance productivity and efficiency for a broad range of white collar employees everywhere. Changes in office organization, such as an emphasis on work groups, leads to demands for flexibility in the location of professional and support staff. In addition, the increased complexity of administrative and management tasks leads to frequent ad-hoc meetings where people should be able to make use of their computers to capture and to exchange information. In addition, the financial industry is moving from over an over-the-counter cash orientation towards more personalized services covering a range of financial products. Putting the customer in the center of their business requires financial institutions to rethink the physical design of their offices. Mobile computer use plays a large role in achieving the required flexibility.

Finally, industrial systems have been using computers for many years, but will only realize the full benefits of advanced computing with a wireless interface. In many cases the systems concerned are centralized: a few computers control a large number of machine tools, conveyor systems, and other devices. With the increasing use of microprocessor technology and with the trend towards flexible production systems, more computing power will be pushed down to the work floor. This will be paralleled by an increased need for more ad-hoc networking between production floor systems. Radio based networks again are ideal for these applications.

B. Wireless Networks Must Evolve To Meet the Higher Data Rate Needs of Emerging Multimedia Computer Applications

The last few years have seen the emergence of wireless data network access as a critically necessary element of the National Information Infrastructure. Most importantly, the computer and wireless industry have actively pursued standards and regulations for wireless Local Area Networks, as exemplified by the work of IEEE 802.11 and the unlicensed PCS rules developed by WINForum and adopted by the FCC. These systems are targeted to provide low to medium speed data transmission services required by the rapidly growing market for wireless computing and wireless data access services.

The development of the High Performance Radio LAN ("HIPERLAN")[1] by the European Telecommunications Standards Institute ("ETSI") has demonstrated that existing wireless networks, while critical to meet today's needs, will be insufficient in the near future

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[1] The HIPERLAN standard is still in development and is awaiting publication for public comment.

to accommodate advanced computing applications. As discussed below, existing wireless systems are incapable of meeting the high speed, high bandwidth needs of multimedia and other resource intensive applications.

1. Today's wireless networks do not support recent developments in broadband network data transmission services

Today's wireless data systems are at an early stage of development relative to the country's wired infrastructure. The wired network has undergone a significant transformation to accommodate new computer applications that are now coming to the forefront. If wireless is to provide access to the full resources of the National Information Infrastructure, wireless access systems *must* undergo a similar evolution.

In recent years, the wired network in the United States has developed dynamically in response to changing needs of computer users. First, frame relay, asynchronous transfer mode ("ATM") and broadband Integrated Services Digital Networks (B-ISDN) have seen significant growth because these technologies contribute to meeting user demands for economical, high bandwidth, long distance communication services. These services are typically used for multimedia applications which include simultaneous voice/video and data sessions between multiple sites. With the increased availability of wireless services in other domains of communication (*e.g.*, LANs, wide area data delivery), there is a clear need to provide users with *wireless* access to these high speed networks. Second, the same switching technology used for broadband long distance services is also being introduced into customer premises networks, enhancing or supplanting current local networks like Ethernet based

LANs. This development has created a contiguous networking environment with consistent service characteristics covering both the long distance wide area high speed communications and premises communications.

Unfortunately, today's wireless systems do not -- and will not be able to -- support services that match the characteristics of these high speed wired networks. There is currently insufficient contiguous spectrum at already allocated frequencies to allow economic implementation of high bandwidth wireless services. Under the circumstances, new spectrum must be allocated for a type of radio system that combines very high speed of operation with the option to implement medium access compatible with broadband services -- SUPERNet.

2. Today's wireless networks are based upon a transmission dichotomy that is increasingly becoming outmoded

The emergence of broadband communications technology has made it possible to minimize the conventional distinction between so-called isochronous (voice/video) services on the one hand and the asynchronous (data) services on the other hand. The use of real time compression on otherwise constant rate sources, such as voice and video, makes more efficient use of bandwidth, but results in the instantaneous bit rate of compressed sources becoming variable. On the other hand, conventional data demand is characterized by short burst of information requiring fast response times but otherwise placing no demands on the rate of delivery. Conventional data is normally transmitted using packet or asynchronous service, while conventional voice and video is normally transmitted using a constant bit rate (isochronous) services. The distinction between these types of traffic -- at least from a communications point of view -- can be eliminated using a high speed transport service and a

proper protocol. Thus, for new applications of broadband communications, the traditional distinction between isochronous and asynchronous modes of operation no longer need apply.

ATM, B-ISDN and Frame Relay systems reflect an evolution of the wired network to support voice, video, and data services interchangeably. Notably, in the case of ATM broadband systems, the old asynchronous/isochronous dichotomy has been replaced by a new regime providing three main types of service: (1) constant bit rate services; (2) variable bit rate services; and, (3) available bit rate services. Users requesting a "virtual circuit" are able to specify the type of service desired and the parameters that further quantify the service required. Advanced wireless networks must evolve in a similar manner to be able to support -- but not be limited to -- the above virtual circuit type service. This evolution extends the requirements of SUPERNet beyond the capabilities of existing wireless offerings.

C. SUPERNet Is Designed To Provide the Wireless Platform for Emerging Multimedia Computer Applications

The intersection of broadband wired networks and wireless access to such networks requires a type of radio system that is capable of offering a level of service that matches the service characteristics of the broadband wired networks. SUPERNet deployment is foreseen in environments with widely differing user requirements in terms of capacity, throughput and delay performance. As discussed below, deployment will occur in both local and "ad-hoc" type applications as well as in applications requiring connection to the wideband wired network, all of which create additive bandwidth requirements. Thus, WINForum has concluded that SUPERNet should able to provide a data rate in excess of 20 megabits per

second ("Mbit/s") in combination with a throughput density on the order of 200 Mbit/s per hectare ("Mbit/s/hectare").

From a deployment perspective, SUPERNet has three major requirements. First, SUPERNet will be required to support internal communications demands now serviced by wired networks (*e.g.*, Ethernet or Token Ring LANs). Second, a key requirement for the SUPERNet user will be the use of the wireless premises network as means to access to broadband infrastructures. The data rates supported by these networks places demands on the performance of the wireless network over and above those resulting from the demands for internal communications. The integration of internal communications and access to infrastructure networks will be a major buying criterion of SUPERNet users. Finally, "ad-hoc" networking (short term internetworking between units in close proximity without supporting fixed facilities) will continue to be required by many users, including those opting for SUPERNet over conventional wireless LANs. The capacity required for ad-hoc networking will be additional to that needed for infrastructure based internal and external communications.

Thus, beyond the minimal data rate requirements needed to provide access comparable to, and complementary with, wired systems, SUPERNet will also need to accommodate a range of deployment options, provide sufficient capacity for internal (intraLAN) communications, permit access to local and wide area networks, and allow for ad-hoc networking. Because users cannot be expected to coordinate their use of SUPERNet systems, static frequency and channel selections will be insufficient to isolate users from each other and assure mutual non-interference. To provide the capabilities described above,

WINForum believes that SUPERNet must provide a minimum data rate of at least 20 Mbit/s in combination with a throughput density on the order of 200 Mbit/s/hectare.

II. SUPERNet WILL REVOLUTIONIZE USERS' EXPECTATIONS OF HOW, WHEN, AND WHERE THEY WILL USE ADVANCED COMPUTING TECHNOLOGY

The applications of high speed wireless LANs cover a wide range of business, administrative and professional usage. While is it relatively easy to provide examples using systems employed today, as high speed wireless LAN technology becomes widely available other uses and applications will emerge which will further increase the use of this technology. The efficiency and competitive benefits listed here are derived from allowing mobile computer users to utilize complex applications that require large bandwidths to communicate with other computers, networks and databases. As the use of this technology spreads, new applications and uses will be developed and new benefits will emerge.

A. SUPERNet Will Enhance the Efficiency of Businesses and Industries and Improve the Quality of Life for the Public Generally

Wireless communications for computers means that computer users are not constrained to using their machines tethered to a network connection. Increased mobility will improve the motivation of people to use their computers in places and under conditions that were not possible before. This will not only bring direct benefits to the users but it will also lead to the emergence of new software products and new service industries that cater to the "mobile" computer users.

First, with the increasing complexity of business and services, computers have become indispensable tools for all kinds of service providers. The trend towards more personalized services can bring additional benefits if the service providers can apply wireless computing to support their staff.

Second, although computers are already becoming mandatory in some schools, wireless networking will greatly improve their use. Wireless computing can reduce the cost of delivering educational data to students, increase students' motivation through graphical and interactive interfaces, and increase students' involvement in the subjects they study. Similarly, on the job training becomes more efficient and continuous education while working becomes a real possibility.

Third, SUPERNet can offset the rapidly increasing national expenditure on health care by providing needed cost reductions and efficiency improvements. Unlike in many cases where cost reductions give rise to the possibility of reduced quality of health care services, wireless computing can help both reduce costs and increase staff efficiency by providing medical care givers with access to the information they need and by providing them with the means to exchange medical and other data with others while at work.

Fourth, by allowing people to interact in a humane manner over multimedia communications networks, SUPERNet will improve the quality of life for all Americans. Wireless networking reduces the need for professional travel and its impact on the environment. SUPERNet also frees individual from the tyranny of rigid meeting requirements, allowing greater personalization of and flexibility in work schedules.

Fifth, SUPERNet can increased the efficiency of "white collar" workers. Most white collar workers spend a large part of their time away from their desk. At the same time, computer support is becoming indispensable in all trades, including general administration. Much of the work done away from the desk has to be redone later, at the desk. The ability to share large volumes of information efficiently with others and independently of ones' own desk will greatly increase the efficiency of many white collar workers.

Sixth, SUPERNet can increased the efficiency of maintenance and repair workers. The complexity of technology makes manuals for maintenance and repair almost useless. Portable computers and wireless networking can give these workers the ability to service even the most complex equipment in shorter times. This increased efficiency will be reflected in higher reliability and improved life cycle cost of major systems.

B. SUPERNet Will Provide U.S. Industries and Businesses With Substantial Competitive Benefits

The application of high speed wireless networks promises to improve the efficiency of people in all occupations from maintenance workers to management. This will, in turn, lead to higher output and lower product costs. Both factors will increase the competitiveness of U.S. industry in general world markets. Beyond that, however, acting expeditiously to authorize SUPERNet will also provide other significant competitive benefits to U.S. industries.

First, SUPERNet will create a large home market for advanced technology products. Freeing spectrum in the U.S. that can support high speed data and multi-media services creates a large home market for products that support these services. These products require

advanced technological solutions to the problems of data transmission in order to deliver the performance demanded by the user community. U.S. industry will be more willing to make the necessary investments if they are assured of a large home market.

Second, SUPERNet will allow U.S. industries to compete on an equal footing in high speed wireless markets domestically and abroad. With Europe having already shown the way, other countries are likely to follow with spectrum for high speed data transmission. This creates a large market in which U.S. industry has to compete with their international peers. European manufacturers have the advantage of a single market, controlled by pan-European regulations. Without a comparable home market, U.S. industry will be at a comparative competitive disadvantage.

III. AN IMMEDIATE ALLOCATION OF 250 MHz IN THE 5.1-5.35 GHz BAND IS REQUIRED TO SUPPORT SUPERNet DEPLOYMENT

A. SUPERNet Will Require 250 MHz of New Spectrum, With Additional Spectrum Reserves for Future Needs

In order to assess the spectrum requirements for SUPERNet, WINForum has relied upon the same spectrum usage model employed previously to determine the spectrum requirements for unlicensed PCS devices.[2] For SUPERNet, however, the model was altered to reflect the video demands of multimedia applications. Specifically, WINForum assumed that a good quality video session will require approximately 1 Mbit/s and that typically four

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[2] *See* Appendix A. The original WINForum analysis did not include the requirements of interworking with infrastructure networks or the additional requirements of multimedia communications, and arrived at estimated spectrum requirements ranging from 20 to 50 MHz in order to satisfy *existing* applications and usage patterns.

people take part in a single session at the same location.[3] Notably, WINForum did not modify the existing WINForum spectrum estimates to take into account other emerging new applications with higher capacity requirements or the need to share capacity between neighboring networks. Based upon WINForum's calculations, which are shown in Appendix A, WINForum estimates that the total spectrum requirement for multimedia applications is approximately 400 MHz in high density areas. Realistically, taking into account the already existing unlicensed allocations and anticipated deployment scenarios, the *minimum* initial allocation needed for SUPERNet should be 250 MHz, with provision for additional spectrum as deployment of SUPERNet begins on a larger scale.

In terms of costs and operating range, allocations in the lower frequency bands are critical for mobile consumer applications. The 1-3 GHz range of the radio spectrum, however, is intensely used and leaves no space for a significant allocation to SUPERNet. At the upper end of the useable frequency band (*e.g.*, above 10 GHz), there is a lot of spectrum that is either underused or not used at all. Unfortunately, the typical use of SUPERNet will be in combination with portable computers and similar devices. Because SUPERNet is targeted at not only business, but also consumer, educational, industrial, and medical applications, the high cost of the technology needed to exploit these very high frequency bands would, as a practical matter, deny the benefits of SUPERNet from those who stand the most to gain from wireless access to the National Information Infrastructure. Thus,

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[3] Although it may be assumed that, with time, more efficient compression schemes will reduce the demands of video bandwidth, the increase in use is likely to offset any gains from compression.

pragmatically, WINForum concluded that the frequency range between 3 and 10 GHz is the only realistic home for SUPERNet.

B. There Is a Unique Opportunity To Provide Sufficient Spectrum for SUPERNet in the 5.1-5.35 GHz Band

WINForum is proposing an expeditious allocation of 250 MHz in the 5.1-5.35 GHz band for SUPERNet. Currently, the proposed band overlaps two allocations, the allocation at 5.0-5.25 GHz for Microwave Landing Systems and the allocation at 5.25-5.5 GHz for government radiolocation systems.[4] However, as discussed below, the United States is transitioning away from MLS use and SUPERNet could share with government radiolocation systems. This provides a unique opportunity to allocate spectrum for this critically necessary service without disruption of existing users or costly bandclearing operations.

In 1994, the FAA announced that they would de-emphasize the development and use of the Microwave Landing System operating in the 5.2 GHz range in favor of the less costly and more economical Differential GPS system. This decision releases 150 MHz of spectrum that would be suitable for SUPERNet.[5] WINForum recognizes that the MLS spectrum is

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[4] As WINForum has previously noted, SUPERNet spectrum requirements upon full deployment could easily require 400 MHz of spectrum. Another benefit of the proposed allocation is that it leaves open the possibility that an additional 150 MHz of spectrum could be allocated in the contiguous 5.35 - 5.5 GHz band at a later date when practical experience has been gained.

[5] WINForum also notes that, in 1992, the European regulators in CEPT allocated the 5.15 - 5.3 GHz band to HIPERLAN for high speed wireless LAN type service under standards set by ETSI. Notably, studies performed by CEPT and ETSI experts have shown that HIPERLAN can operate on channels adjacent to those used by MLS systems without risk of interference.

also a candidate for allocation as uplink feeders for Mobile Satellite Services ("MSS") at the 1995 WRC. However, CEPT and ETSI have analyzed co-channel operation of MSS uplink feeders and the European HIPERLAN system, which is comparable to SUPERNet, and determined that some interference from the feeder uplinks to HIPERLAN systems could occur, but only at short distances (10 - 30 miles).[6] Given typical siting requirements for satellite ground systems, however, ETSI and CEPT expect no real interference in practice. CEPT and ETSI also determined that there was only a negligible interference threat from HIPERLAN systems to MSS feeder links. Because SUPERNet will have channelization and transmitter power specifications comparable to HIPERLAN, WINForum believes that SUPERNet can share the 5.1 - 5.25 GHz band with MSS feeder links without detrimental interference to or from MSS systems operating this band.

The proposed SUPERNet spectrum above 5.25 GHz is allocated to the government for radiolocation services.[7] Due to the classified nature of the systems deployed at these frequencies, a detailed analysis can not be made. However, assuming that the systems actually in use are typically long distance radar systems, WINForum expects the same co-existence considerations as given for the MSS feeder links to apply. These considerations include the siting of these systems away from most urban and industrial areas. Therefore, WINForum believes SUPERNet could be operated in this part of the spectrum without causing detrimental interference.

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[6] *See* Appendix B.

[7] The spectrum above 5250 MHz is administered by the NTIA rather than the FCC. WINForum sees no need to transfer administrative responsibility for this spectrum from the NTIA to the FCC because of the shared use proposed here.

IV. SUPERNet SHOULD BE AN UNLICENSED SERVICE SUBJECT TO MINIMAL CHANNELIZATION AND POWER LIMITS AND NON-INTERFERENCE SHOULD BE ENFORCED THROUGH AN INDUSTRY CONSENSUS SHARING PROTOCOL

WINForum does not advocate wholesale importation of the HIPERLAN standard for SUPERNet. Rather, WINForum believes that SUPERNet should expand upon the HIPERLAN model.[8] However, there are benefits to be gained in some respects from retaining a minimal level of compatibility with HIPERLAN systems, at least with respect to frequency assignments and channelization. Accordingly, WINForum proposes below the basic channelization and technical regulations for SUPERNet, which are to a degree based upon the prior work of ETSI and CEPT, but proposes development of a more advanced and robust sharing scheme for SUPERNet devices.

A. SUPERNet Spectrum Should Provide Wideband Channels And a Means for Spectrum Sharing Between Devices

WINForum proposes that the Commission should provide for approximately 10 wideband subchannels within the SUPERNet allocation.[9] Increasing the data rate of wireless systems does not reduce the need for channelization. The effectiveness in terms of net data rate goes down with increasing raw data rates because a significant part of the transmission

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[8] *See* Appendix C.

[9] There is a possibility that time channelization as well as frequency channelization may prove appropriate and economical in the near future. Also, more spectrum may become available. Either of these possibilities may lead to a need for wider channels. The possibility of providing for channel widths in integer multiples of a standard width will be further studied.

overhead is time dependent rather than bit rate dependent. Further -- and more significantly -- the re-use of channel capacity is determined by the frequency separation between service areas. Because radio transmissions interfere with each other over distances that exceed the distance of useful data delivery by a factor two or more, the actual capacity supported in a given area may be a small fraction of the raw channel capacity. With frequency separation between networks (service areas) this interference is reduced in correspondence to the number of channels available. Ultimately, WINForum believes this argues in favor of a multiplicity of channels, even considering the channel width required for the desired data rate of 20 Mbit/s or more.[10] WINForum also notes that the HIPERLAN standard employs 5 channels of 23.5 MHz wide spaced at 23.5 MHz.

Consistent with HIPERLAN and unlicensed PCS specifications, WINForum also believes that information transmission in the SUPERNet spectrum should be limited to data encapsulated in packetized form. Recent experience with wireless data systems as well as wired broadband networks has demonstrated the efficacy of packetized information transmission and its ability to support a variety of service types ranging from voice services to multi-media services. WINForum accordingly recommends that SUPERNet require

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[10] WINForum considered the possibility of allowing narrower channels to exist in the same frequency band such that a number of narrow channels would overlap a wider channel. This is a feature, for example, of the unlicensed PCS spectrum etiquette. For SUPERNet, however, such flexibility would be detrimental rather than advantageous. Multiple narrow channel widths invite low rate usage for which other frequencies are available and would reduce spectrum utilization. A single occupied narrow channel would lock out a wide band channel and leave a lot of bandwidth unused. A single channel width, on the other hand, would assure that all products and services offer a data rate of comparable magnitude without fixing that data rate.

packetized information transmission, subject to a packet lengths and protocols agreed upon by industry consensus.

SUPERNet devices should also be subject to low-power operational limitations and emission mask requirements to minimize interference. In order to promote spectrum sharing by SUPERNet transmitters, WINForum recommends that SUPERNet be limited to low power operations. Furthermore, in order to limit adjacent channel interference between SUPERNet channels and minimize any potential for interference with adjacent spectrum users, WINForum suggests limiting out of band emissions.

B. SUPERNet Devices Should Be Required To Conform to an Industry Consensus Sharing Protocol Governing Access to Spectrum

As previously discussed, SUPERNet deployment should be both as wireless access for a wired infrastructure and as an ad-hoc network of nomadic devices anywhere and at anytime. No restrictions should be placed on the purposes for which SUPERNet is used. Under the circumstances, WINForum believes that the only feasible model for SUPERNet is as an unlicensed service subject to a spectrum sharing protocol, or etiquette, similar in concept to unlicensed operations under Subpart D of the Commission's rules for PCS devices. As discussed below, because of the expanded capabilities envisioned for SUPERNet, WINForum believes the specifics of the sharing protocol should be developed through a consensus process and WINForum has already begun setting the foundation for joint industry action in this area.

SUPERNet must operate on an unlicensed, shared basis because SUPERNet is designed to offer different operational characteristics to address different user requirements